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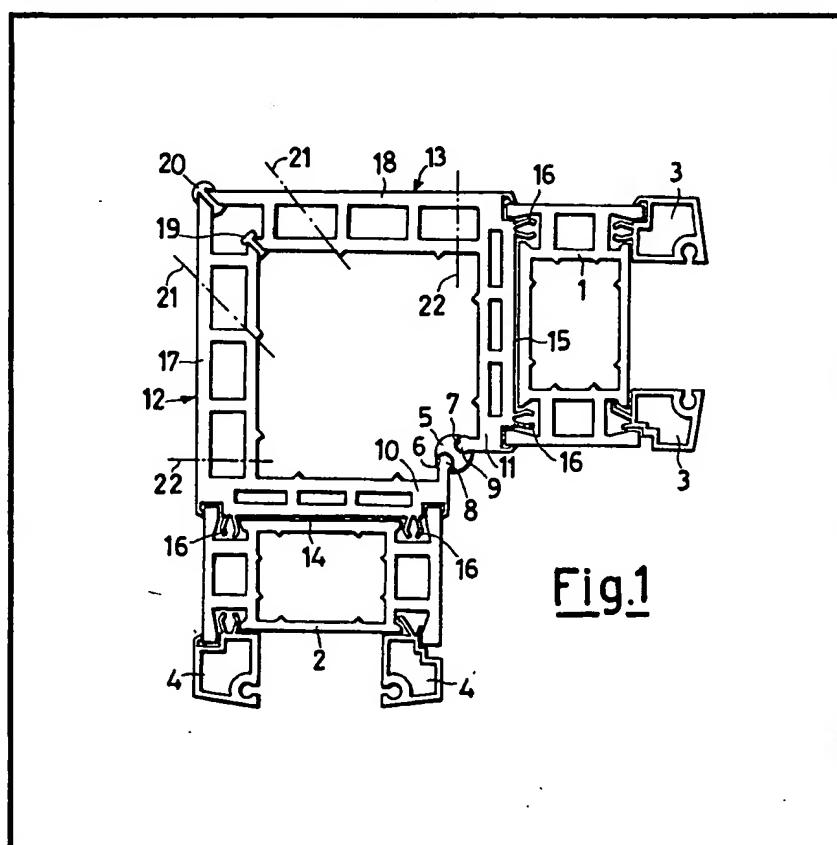
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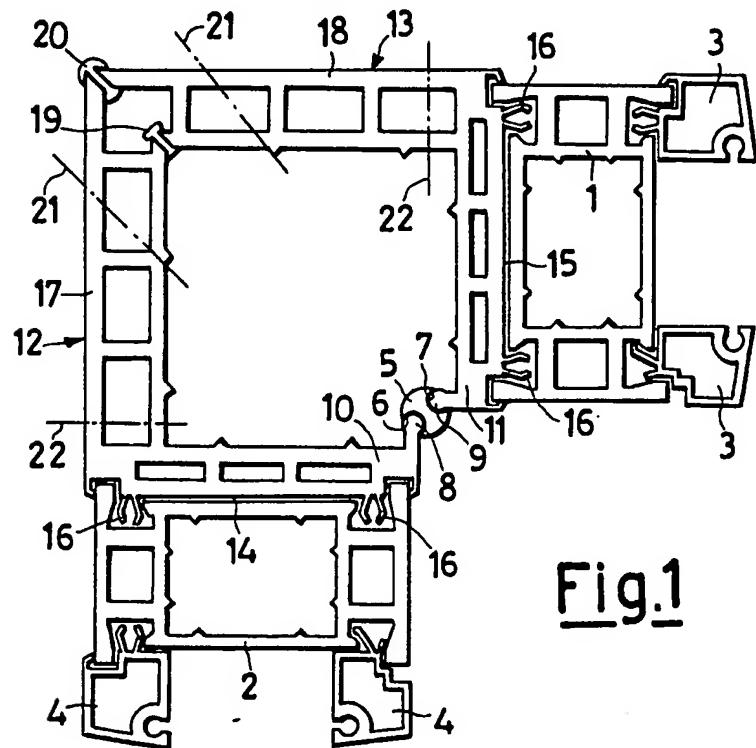
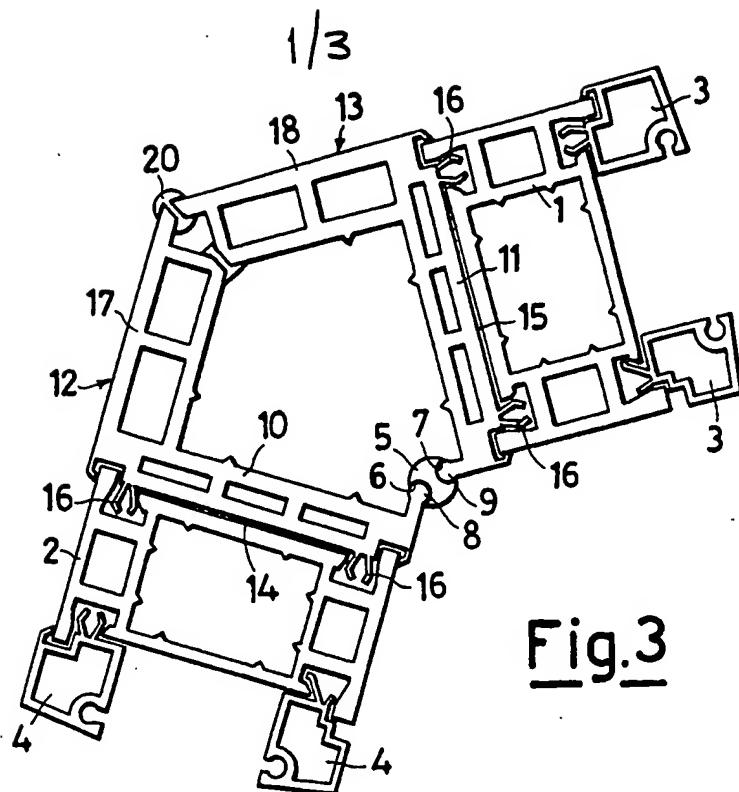
## (54) Connecting window frames

(57) Two adjoining window frames (1, 3 and 2, 4) can be connected together at a preselected angle by means of a structure which comprises two supports (12 and 13) to be connected to the fixed uprights (2 and 1) of the adjoining frames, the supports (12 and 13) each having a projection (8 or 9) of circular cross-section to be pivotally engaged in a respective recess (6 or 7) of an element (5). The structure allows the supports to be set at any desired angle relative to one another by appropriately cutting the arms 17, 18 of the supports, pivoting the supports, and then securing the free ends of the arms 17, 18 by glue or adhesive tape at 19 and a thermoplastic seal 20. The supports 12, 13 and the element 5 are of thermoplastics.



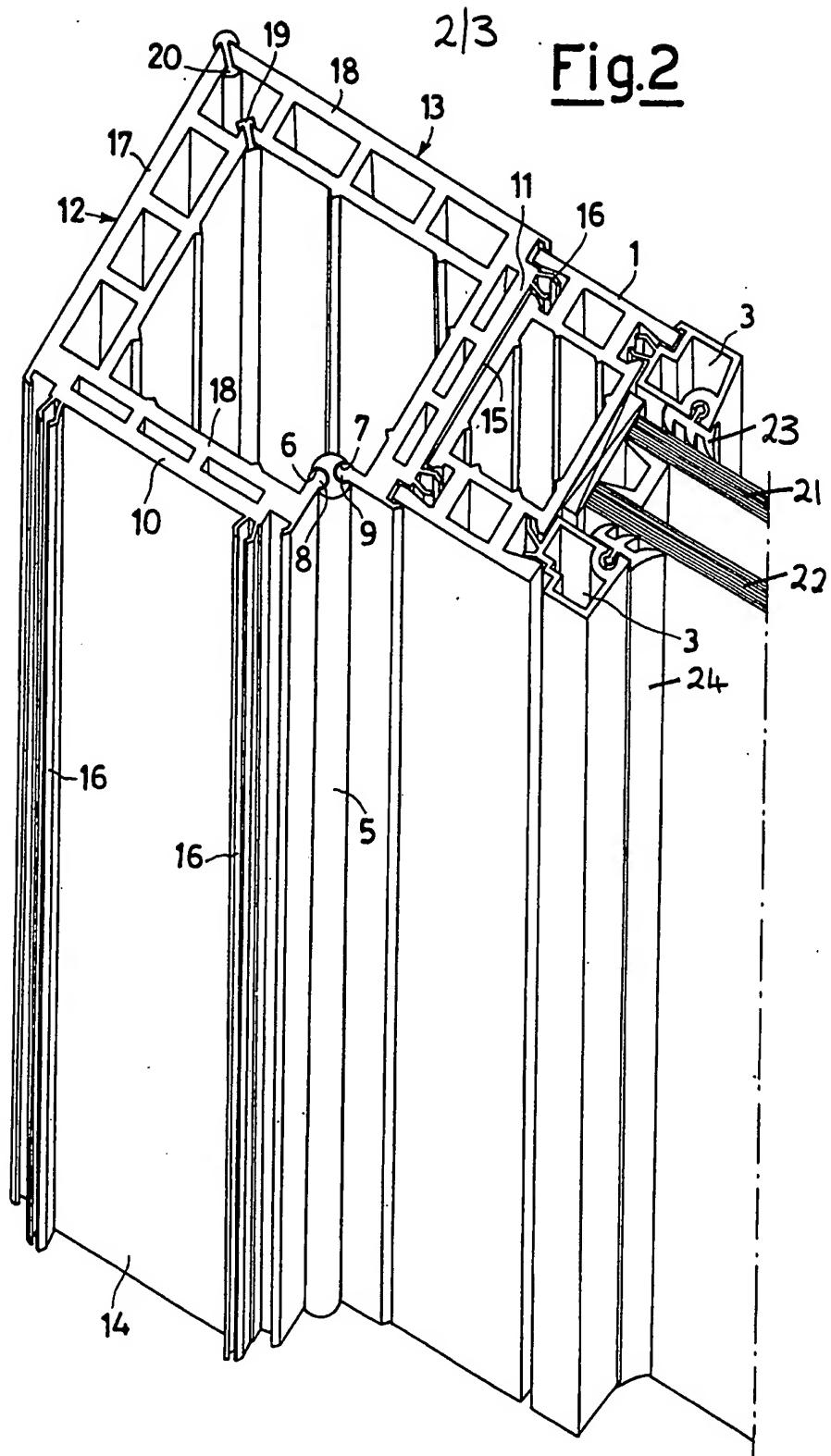
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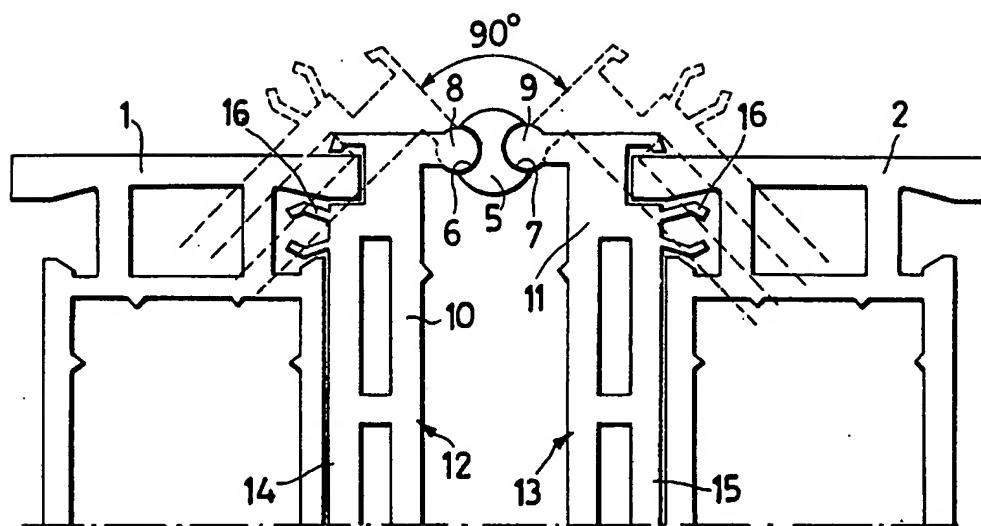
Fig.2



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Fig.4



**SPECIFICATION****Structure suitable for connecting window frames together**

- 5 This invention relates to a structure for use in joining together window frames at any required contained angle and for any size of window frame to be connected together.
- 10 In constructing outwardly projecting external angular windows either of the simple type (the so-called bay windows), or of the complex type (the so-called bow windows), and in constructing internal glazed panels for room division, it is necessary to connect together the constituent frames of the windows and glazed panels at an angle to each other.
- 15 At the present time, this angular connection is made by a system consisting of a rigid angle section of fixed contained angle, to which are fixed the two adjacent window frames to be connected together angularly.
- 20 However, such a known system has various drawbacks, both technical and economical. In this respect, as it is a rigid system, a large number of sections of different contained angles must be available in order to be able to satisfy all requirements, thus increasing production costs and storage complications. Fur-
- 25 ther, as the contained angle of the finished window cannot be changed even by a small amount during its installation, the known angle section with its fixed contained angle does not always allow installation to be carried out
- 30 with perfect adherence and matching to the masonry work, with the result that further matching work is necessary, which very often has to be carried out in the workshop and not *in situ*, leading to a considerable loss of time
- 35 and consequent increase in installation costs.
- 40 According to the present invention, there is provided a structure, in assembled or dismantled form, for use in joining together two window frames at a predetermined angle, the
- 45 structure comprising:—
- 50 a longitudinally-extending first support having on one side provision for attachment to a window frame and on the other side a longitudinally-extending headpiece of generally circular cross-section;
- 55 a longitudinally-extending second support having on one side provision for attachment to another window frame and on the other side a longitudinally-extending headpiece of generally circular cross-section; and
- 60 a longitudinally-extending element having in opposed regions two recesses of part-circular cross-section, in which recesses are pivotally located or locatable the headpieces of the first
- 65 and second supports;
- 70 the arrangement being such that, in use, with the headpieces in the recesses of the element and with regions of the first and second supports remote from the element
- 75 secured to each other, the support is suitable

for joining together two window frames at a predetermined angle.

The present invention makes it possible to obviate the afore-mentioned drawbacks and to provide a system which is simple, economical and rapid to install, and which enables the contained angle to be varied to give the required angle at which two adjacent window frames have to be connected together.

75 The cross-section of the element may be circular or polygonal, apart from the recesses. Preferably the diameter of each headpiece is slightly less than that of the recess in which the headpiece is located or locatable.

80 Preferably the structure also includes means for securing together those regions of the first and second supports remote from the element.

85 Preferably the centres of the circles of the part-circular recesses lie within the circumference of the element.

The first and second supports are preferably identical.

90 Preferably each of the first and second supports has an L-shaped cross-section constituted by a first arm and second arm.

95 Preferably the headpiece of each support projects perpendicularly or substantially perpendicularly from a free end region of the first arm of the respective headpiece, in the same direction and sense as the second arm.

100 Preferably the first arm of each support is provided on that side remote from the headpiece with coupling means for attachment to a window frame.

105 Preferably each of the first and second arms of the first and second supports comprises two spaced-apart walls.

110 Preferably the second arms are cut at an angle in their free end regions where they are to be secured to each other, the internal walls of the second arms being secured together, and the external walls of the second arms being secured together in a sealed manner.

115 Conveniently the internal walls are secured by an adhesive or double-sided adhesive tape, and the external walls are secured by a sealing gasket.

120 Preferably the sealing gasket and the first and second supports and the element are formed of extruded thermoplastic plastics material. The plastic material can be, for instance, polyvinyl chloride.

125 The advantages of the structure of the present invention, practically a hinged joint, are immediately apparent.

Firstly, as the structure is constituted by components which are easily assembled *in situ*, merely by inserting the headpieces of the supports from the top downwards or *vice versa* into the respective recesses provided in the element, there are no severe storage complications. This is even more especially so, because as the contained angle of the frames

130 to be connected together can be varied at will

from 90° to 180° by simply cutting the free ends of the second arms of the supports, the same components, when trimmed, can be used to satisfy all different angles and it is thus no longer necessary to have large numbers of components of different contained angles available.

Furthermore, the components of the structure of the present invention are simple, and the two supports are similar, thus giving ease of construction.

Finally, the facility for setting the contained angle of the finished window during its installation by cutting the free ends of the supports *in situ* rather than in the workshop, this cutting being aided when the supports are of thermoplastic material, allows easy assembly of the window with perfect adherence and matching to the masonry.

For a better understanding of the present invention and to show how the same may be carried into effect, reference will now be made, by way of example, to the accompanying drawings, in which:

**Figure 1** is a plan view of one embodiment of the structure of the present invention connecting together two window frames at a contained angle of 90°;

**Figure 2** is an isometric view of the structure of the present invention shown in Fig. 1, but with one window frame omitted for clarity;

**Figure 3** is a plan view of the same embodiment of the structure of the present invention connecting together two window frames at a contained angle greater than 90°; and

**Figure 4** is a partial plan view on a different scale of the structure according to the present invention for connecting two window frames together at a contained angle of 180°.

With reference to the drawings, in which the same elements are indicated by the same reference numerals, a first window frame has an upright 1 to which is secured a sub-frame 3, and a second window frame has an upright 2 to which is secured a sub-frame 4. The first frame 1, 3 is connected at an angle to the second frame 2, 4 by a structure according to the present invention.

This structure includes a solid extruded thermoplastic profiled element 5 of generally circular cross-section except for two longitudinally-extending recesses 6 and 7 of part-circular cross-section, which are provided in diametrically opposing regions in the element 5. The recesses 6 and 7 rotatably house two longitudinally extending headpieces 8 and 9 respectively, having a circular cross-section of diameter imperceptibly less than the diameter of the recesses 6 and 7.

The structure also includes a longitudinally-extending first support 13 and a longitudinally-extending second support 12, each of which is of L-shaped cross-section with each arm of the L being formed by two parallel

spaced-apart walls.

The headpieces 8 and 9, which are inserted into the respective recesses 6 and 7 from the top downwards or *vice versa*, project perpendicularly at, respectively, the free end region of a first arm 10 of the second support 12 and at the free end region of a first arm 11 of the first support 13. The two supports 12 and 13 are identical extruded thermoplastic sections.

The first arms 10 and 11 of the supports 12 and 13 are provided on the external surfaces of their external walls 14 and 15 with longitudinally-extending couplings 16 for attachment to uprights 2 and 1 of the second and first window frames respectively.

The other (second) arms 17 and 18 of the second and first supports 12 and 13 act as a shoulder for fixing the supports 12 and 13 in a position corresponding to the required contained angle between the window frames, and their free ends are kept together by means of a joint 19, constituted for example by a glue or double-sided adhesive tape applied to their 90 internal walls, and by means of an extruded thermoplastic seal joint 20 disposed at the edge of their external walls.

The arms 10, 17 and 11, 18 respectively of the second and first supports 12 and 13 are, in the embodiment of Fig. 1, of approximately equal length, so that when the arms 17 and 18 have been fixed together at their free ends, a geometrical structure of square cross-section is obtained, thus ensuring that the two window frames 1, 3 and 2, 4 are at a contained angle of 90° to each other.

To obtain a contained angle greater than 90°, the arms 17 and 18 are suitably cut, and the cut ends of these arms are fixed together by rotating the supports 12 and 13 about the element 5.

As an example, to obtain a contained angle greater than 90° as illustrated in Fig. 2, the two arms 17 and 18 must be cut respectively along the dashed lines 21 of Fig. 1; alternatively, to obtain a contained angle of 180° as illustrated in Fig. 4, the cuts must be made along the dotted lines 22 of Fig. 1.

Fig. 4 also shows by means of dashed lines the position which the supports 12 and 13 would assume for a contained angle of 90°.

Fig. 2 additionally shows two sheets 21 and 22 of glazing material and their respective seals 23 and 24.

## 120 CLAIMS

1. A structure, in assembled or dismantled form, for use in joining together two window frames at a predetermined angle, the structure comprising:

a longitudinally-extending first support having on one side provision for attachment to a window frame and on the other side a longitudinally-extending headpiece of generally circular cross-section;

- a longitudinally-extending second support having on one side provision for attachment to another window frame and on the other side a longitudinally-extending headpiece of
- 5 5 generally circular cross-section; and a longitudinally-extending element having in opposed regions two recesses of part-circular cross-section, in which recesses are pivotally located or locatable the headpieces of the first
- 10 and second supports; the arrangement being such that, in use, with the headpieces in the recesses of the element and with regions of the first and second supports remote from the element
- 15 secured to each other, the support is suitable for joining together two window frames at a predetermined angle.
2. A structure as claimed in Claim 1, wherein the element is of circular cross-section, apart from the recesses.
- 20 3. A structure as claimed in Claim 1, wherein the element is of polygonal cross-section, apart from the recesses.
4. A structure as claimed in Claim 1, 2 or 25 3, wherein the diameter of each headpiece is slightly less than that of the recess in which the headpiece is located or locatable.
5. A structure as claimed in any preceding claim, which also includes means for securing
- 30 together those regions of the first and second supports remote from the element.
6. A structure as claimed in any preceding claim, wherein the centres of the circles of the part-circular recesses lie within the circumference of the element.
- 35 7. A structure as claimed in any preceding claim, wherein the first and second supports are identical.
8. A structure as claimed in any preceding
- 40 40 claim, wherein each of the first and second supports has an L-shaped cross-section constituted by a first arm and a second-arm.
9. A structure as claimed in Claim 8,
- 45 45 wherein the headpiece of each support projects perpendicularly or substantially perpendicularly from a free end region of the first arm of the respective headpiece, in the same direction and sense as the second arm.
10. A structure as claimed in Claim 8 or
- 50 50 9, wherein the first arm of each support is provided on that side remote from the headpiece with coupling means for attachment to a window frame.
11. A structure as claimed in Claim 8, 9
- 55 55 or 10, wherein each of the first and second arms of the first and second supports comprises two spaced-apart walls.
12. A structure as claimed in Claim 11,
- 60 60 wherein the second arms are cut at an angle in their free end regions where they are to be secured to each other, the internal walls of the second arms being secured together, and the external walls of the second arms being secured together in a sealed manner.
- 65 13. A structure as claimed in Claim 12,
- wherein the internal walls are secured by an adhesive or double-sided adhesive tape, and the external walls are secured by a sealing gasket.
- 70 14. A structure as claimed in Claim 13, wherein the sealing gasket is formed of an extruded thermoplastic plastics material.
15. A structure as claimed in any preceding claim, wherein the first and second supports and the element are formed of extruded thermoplastic plastics material.
- 75 16. A structure according to Claim 1, substantially as herein before described with reference to, and as illustrated in, Figs. 1 and 2, 80 or Fig. 3, or Fig. 4 of the accompanying drawings.
17. In combination, an upright of a window frame, an upright of another window frame, and, securing the uprights at a predetermined angle, a structure according to any preceding claim.

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